

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
18 December 2003 (18.12.2003)

PCT

(10) International Publication Number
WO 2003/103745 A3

(51) International Patent Classification⁷: **A61N 1/36**

(21) International Application Number:
PCT/US2003/018644

(22) International Filing Date: 11 June 2003 (11.06.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/388,136 11 June 2002 (11.06.2002) US

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant and

(72) Inventor: **ABOUL-HOSN, Walid** [US/US]; 4625
Chicago Avenue, Fair Oaks, CA 95628 (US).

Published:

— with international search report

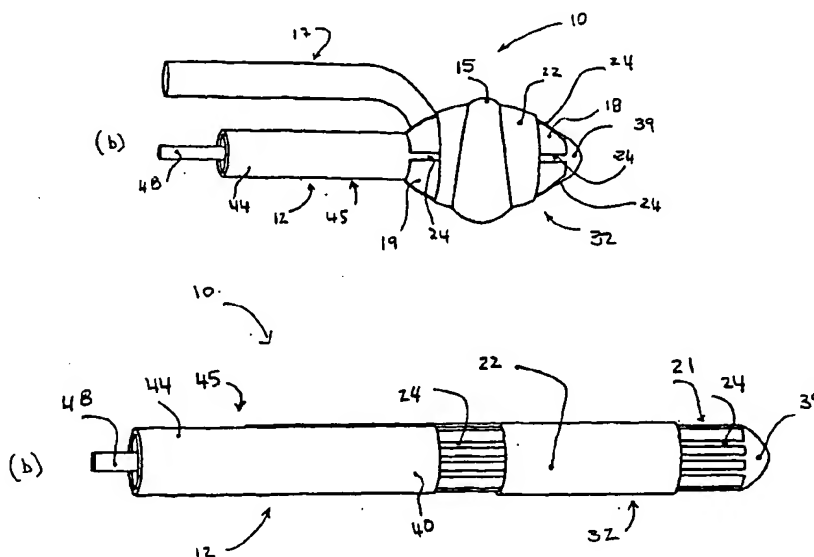
(74) Agent: **SPANGLER, Jonathan**; 2875 Kalmia Place, San
Diego, CA 92104 (US).

(88) Date of publication of the international search report:
8 April 2004

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **EXPANDABLE BLOOD PUMP AND RELATED METHODS**



(57) Abstract: The present invention involves a blood pump (32) having a blood pump and internally disposed rotor, wherein each of the pump housing and rotor are capable of being expanded from a first state of generally reduced dimension (fig. 2b) to a second state of generally increased dimension (fig. 1b). The blood pump may be advantageously introduced into the patient (and onward to the pumping site) while in the first state and thereafter operated (automatically or manually) into the second state for use in pumping blood to augment or replace the pumping capacity of the heart.

WO 2003/103745 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/18644

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61N 1/36

US CL : 600/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 600/16-18

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

East: pump and collas\$ or expand\$ or inflat\$ or deflat\$

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,820,542 A (DOBAK, III et al.) 13 October 1998, see entire document.	1
X	US 4,919,647 A (NASH) 24 April 1990, see entire document.	1-4, 6-8, and 11-13

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

14 November 2003 (14.11.2003)

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Date of mailing of the international search report

12 JAN 2004

Authorized officer

Jeffrey R. Jastzab

Telephone No. (703) 308-0858